

Atomic Theory Review

Characteristics of a Wave

- 1) What are the important equations relating wavelength, frequency, speed, and energy of a wave?
- 2) A laser in eye surgery to fuse detached retinas produces radiation with a wavelength of 640.0 nm ($1 \text{ nm} = 1 \times 10^{-9} \text{ m}$). Calculate the frequency and energy of this wavelength. What type of electromagnetic radiation is this?

Important Scientists and Their Contributions

- Planck
- Einstein
- De Broglie
- Dual Nature of light

Bohr versus Quantum Models

- 1) Contrast the difference between the two models.
- 2) Determine the energy associated with a transition from $n=3$ to $n=1$. What wavelength is associated with this energy and what type of electromagnetic radiation is this?

Quantum Numbers

- 1) Describe the four quantum numbers and state the rules for the numerical values of each.
- 2) Which of the following sets of quantum numbers are not allowed? For each incorrect set, state why it is correct. The numbers are given in the following order: n, l, m_l, m_s .
 - (a) 3, 3, 0, $-\frac{1}{2}$
 - (b) 4, 3, 2, $-\frac{1}{2}$
 - (c) 4, 1, 1, $\frac{1}{2}$
 - (d) 2, 1, -1, -1
 - (e) 5, -4, 2, $\frac{1}{2}$
 - (f) 3, 1, 2, $-\frac{1}{2}$

Electron Configuration

- 1) Define the following principles/rules: Hund's rule, Pauli's exclusion principle, Aufbau principle.
- 2) What elements are exceptions to the electron configuration? What is an example of their electron configuration?